



Multi-decadal temperature variability of the deep North Atlantic Subpolar Gyre

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The multi-decadal temperature fluctuations of the deep subpolar North Atlantic are investigated from an objective analysis of observational data (EN4). A striking transition from cooling during 1980-1995 to warming during 1995-2015 is found between 1000 and 3000 m depth, with a spatial signature widespread over the whole gyre. Within an isopycnal framework, we show that locally forced volume changes of water masses, such as those undergone by Labrador Sea Water between the late 1990s and the early 2000s, contribute to the spreading of density-compensated temperature anomalies (spiciness) in the intermediate layer. Such anomalies, which reflect the deep sequestration of the Atlantic Multidecadal Oscillation signal, are then progressively propagating westward and southward within the subpolar gyre, and down to the subtropics.